

## **Anthrax: Information for Health Care Providers**

---

### **□ Epidemiology**

- ✓ Soil is the natural reservoir for *Bacillus anthracis*, the causative agent of anthrax.
- ✓ Anthrax is predominantly a disease of animals.
- ✓ Livestock or herbivores acquire infection from consuming contaminated soil or feed.
  - ◆ Anthrax is endemic in parts of Asia, Latin America, Africa, and the Mediterranean.
  - ◆ In the U.S., natural outbreaks among animals have occurred in the Midwest, West, Texas, and Oklahoma.
- ✓ Naturally occurring illness in humans occurs following exposure to infected animals or contaminated animal products (e.g., hair, wool, hides, and consumption of undercooked meat).

#### **Anthrax and Bioterrorism**

- ✓ *B. anthracis* was weaponized in the former U.S. and USSR biowarfare programs.
- ✓ Anthrax spores were used to deliberately contaminate mail in 2001, resulting in 22 cases and five deaths in the Eastern U.S.
- ✓ Aerosolization is thought to be the most likely mode of dissemination of anthrax spores in a biological attack; inhalational and cutaneous anthrax are possible clinical presentations.

### **□ Microbiology and Pathogenesis**

- ✓ *B. anthracis* is a large, nonmotile, spore-forming, aerobic or facultatively anaerobic, gram-positive bacillus.
- ✓ Hardy spores are resistant to drying, heat, and radiation.
- ✓ Spores are introduced to the body via the lungs, gastrointestinal tract or skin, phagocytosed by macrophages, and carried to regional lymph nodes.
- ✓ Spores can remain dormant in lymph nodes for up to 60 days before germinating into vegetative cells.
- ✓ Two binary toxins - edema toxin and lethal toxin - impair water homeostasis and lead to inflammation and tissue necrosis.

### **□ Clinical Presentation**

#### **Cutaneous Anthrax**

- ◆ Accounts for 95% of naturally occurring anthrax cases.
- ◆ The incubation period is one to seven days.

- ◆ After inoculation on skin or mucous membranes, a small, sometimes pruritic, papule or vesicle develops.
- ◆ The papule ulcerates by the second day with central necrosis and drying, is surrounded by painless, non-pitting edema, and may be encircled by fine vesicles that enlarge over the next one to two days.
- ◆ An overlying, painless black eschar forms over the ulcerated area after one to two days and sloughs off after 12 to 14 days.
- ◆ Fever and malaise are common.
- ◆ Person-to-person transmission is rare.
- ◆ With appropriate antibiotics, the case-fatality rate is less than 1%.

#### **Inhalational Anthrax**

- ◆ The incubation period is two to 43 days (usually less than one week).
- ◆ Illness may be biphasic with an initial non-specific prodrome of symptoms such as fever, malaise, fatigue, and anorexia followed by a sudden increase in fever, respiratory distress, diaphoresis, and shock, if untreated.
- ◆ Fever, sweats, cough (minimally or non-productive), nausea/vomiting, chest discomfort, and dyspnea were common in the 2001 outbreak cases.
- ◆ Bacteremia with subsequent sepsis and meningitis may develop.
- ◆ There is no known person-to-person transmission.
- ◆ The case fatality rate was 45% in the 2001 outbreak in Eastern U.S. and 86% in the 1979 Sverdlovsk outbreak.

#### **Gastrointestinal Anthrax**

- ◆ The incubation period is one to seven days.
- ◆ Mucosal ulcer(s) develop, followed by regional lymphadenopathy.
- ◆ Fever, abdominal tenderness, diarrhea, vomiting, and headache are common.
- ◆ Pharyngeal edema, ascites, meningitis, and gastrointestinal perforation, obstruction, or hemorrhage can occur.
- ◆ There is no person-to-person transmission.
- ◆ The case-fatality rate is 25-60%.

# Public Health

## Seattle & King County Fact Sheet

### Anthrax: Information for Health Care Providers

#### ☐ **Diagnosis**

- ✓ Gram stain and culture of lesion, blood, cerebrospinal fluid, respiratory, and gastrointestinal specimens.
- ✓ Confirmatory testing by gamma phage and direct fluorescence assay is performed at WA State Public Health Laboratory; contact Public Health – Seattle & King County for packaging and transport instructions for clinical specimens.
- ✓ Serologic testing may be used for retrospective diagnosis.
- ✓ Chest radiograph may show a widened mediastinum, hilar adenopathy, infiltrates/consolidation, or pleural effusions.
- ✓ CT scan of the chest may show abnormalities earlier than chest x-ray; hyperdense lymphadenopathy on a non-enhanced chest CT is suggestive of anthrax.
- ✓ Nasal swabs are not useful for clinical decision-making but may be useful for epidemiologic assessment.

#### ☐ **Infection Control**

- ✓ Standard precautions are adequate.
  - ◆ Soap and water is adequate for hand washing; bleach is not necessary.
  - ◆ Respiratory transmission has not been documented, and therefore isolation of patients is not necessary.
- ✓ Cover cutaneous lesions and treat dressings as a biohazard waste.

#### ☐ **Treatment and Prophylaxis**

- ✓ First-line antibiotics for treatment or prophylaxis include ciprofloxacin and doxycycline.
- ✓ Patients with inhalational anthrax should be treated for 60 days with two or three antibiotics, initially IV, switching to oral therapy when clinically appropriate.
- ✓ Antibiotic prophylaxis should be provided for those with a suspected or known exposure to *B. anthracis*, as determined by public health officials, for 60 to 100 days post-exposure.
- ✓ Refer to <http://www.bt.cdc.gov> for current treatment and prophylaxis guidelines.
- ✓ **Anthrax vaccine**
  - ◆ The vaccine is prepared from cell-free infiltrates of cultures of avirulent, nonencapsulated *B. anthracis*.

- ◆ It is recommended as pre-exposure prophylaxis for those with occupational exposure to *B. anthracis* (six doses administered subcutaneously).
- ◆ The vaccine is in limited supply and not available nor indicated for pre-exposure use in the general public.
- ◆ Adverse reactions include local erythema, pain, fever, chills, myalgia, and nausea.
- ◆ New vaccines are in development and alternative dosing schedules and route of administration are under investigation.

#### ☐ **Web resources**

- ✓ Centers for Disease Control and Prevention:  
<http://www.bt.cdc.gov>
  - ◆ Treatment and prophylaxis:  
<http://www.bt.cdc.gov/agent/anthrax/treatment/index.asp>
- ✓ Public Health – Seattle & King County:  
<http://www.metrokc.gov>
- ✓ Infectious Disease Society of America:  
<http://www.idsociety.org>
- ✓ Bioterrorism preparedness training modules:  
<http://healthlinks.washington.edu/nwcphp/bttrain/>
- ✓ Washington Department of Health:  
<http://www.doh.wa.gov>

**Report all suspected cases of anthrax immediately to Public Health – Seattle & King County by calling (206) 296- 4774.**